

500, 503

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 July 2003 (24.07.2003)

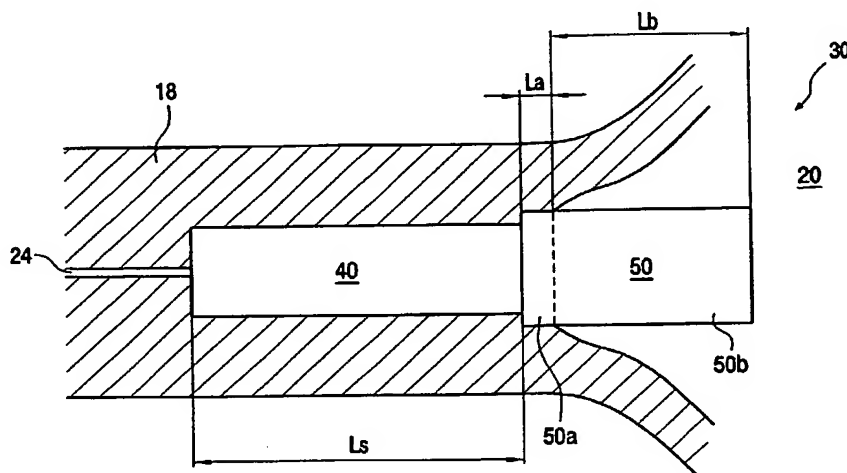
PCT

(10) International Publication Number
WO 03/060947 A2

- (51) International Patent Classification⁷: **H01J 61/073, 61/34**
- (21) International Application Number: **PCT/IB02/05290**
- (22) International Filing Date:
12 December 2002 (12.12.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
102 00 009.3 2 January 2002 (02.01.2002) DE
- (71) Applicant (for DE only): **PHILIPS INTELLECTUAL PROPERTY & STANDARDS GMBH** [DE/DE]; Stein-
damm 94, 20099 Hamburg (DE).
- (71) Applicant (for all designated States except DE, US):
KONINKLIJKE PHILIPS ELECTRONICS N.V.
[NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven
(NL).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): **HAACKE, Michael**
[DE/DE]; c/o Philips Intellectual Property & Standards
GmbH, Weisshausstr. 2, 52066 Aachen (DE).
- (74) Agent: **VOLMER, Georg**; Philips Intellectual Property &
Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK,
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: DISCHARGE LAMP



(57) Abstract: A discharge lamp (10) is disclosed with a closed discharge vessel (20) which is surrounded by a wall of transparent material. Two electrodes (30) are present, partly embedded in the wall and projecting into the interior of the discharge vessel (20). At least one, but preferably both electrodes (13) are elongate in shape and comprise a head part (50) and a shaft part (40), which are distinguished by different diameters and/or different materials. Tungsten is preferred for the head part (50) and a tungsten-rhenium alloy for the shaft part (40). The shaft part (40) is enclosed in the wall material, usually quartz, whereas of the head part (50) only a first, short portion (50a) is in contact with the wall, while its second, longer portion (50b) projects into the interior of the discharge vessel (20). Favorable diameters for the head part (50) were found to be 350 to 450 μm , and for the shaft part (40) 150 to 400 μm . A long lamp life is achieved with the electrode design according to the invention, in particular in thermally strongly loaded discharge lamps as preferred for automotive applications. There are additional advantages in a lesser crystallization of the discharge vessel (20), less burning-off of the electrodes (30), and an improved run-up behavior.

WO 03/060947 A2

WO 03/060947 A2



Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 July 2003 (24.07.2003)

PCT

(10) International Publication Number
WO 2003/060947 A3

(51) International Patent Classification⁷: **H01J 61/073**,
61/34, 61/36

[DE/DE]; c/o Philips Intellectual Property & Standards
GmbH, Weisshausstr. 2, 52066 Aachen (DE).

(21) International Application Number:
PCT/IB2002/005290

(74) Agent: **VOLMER, Georg**; Philips Intellectual Property &
Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).

(22) International Filing Date:
12 December 2002 (12.12.2002)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
102 00 009.3 2 January 2002 (02.01.2002) DE

(71) Applicant (*for DE only*): **PHILIPS INTELLECTUAL
PROPERTY & STANDARDS GMBH** [DE/DE]; Stein-
damm 94, 20099 Hamburg (DE).

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK,
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except DE, US*):
KONINKLIJKE PHILIPS ELECTRONICS N.V.
[NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven
(NL).

(72) Inventor; and

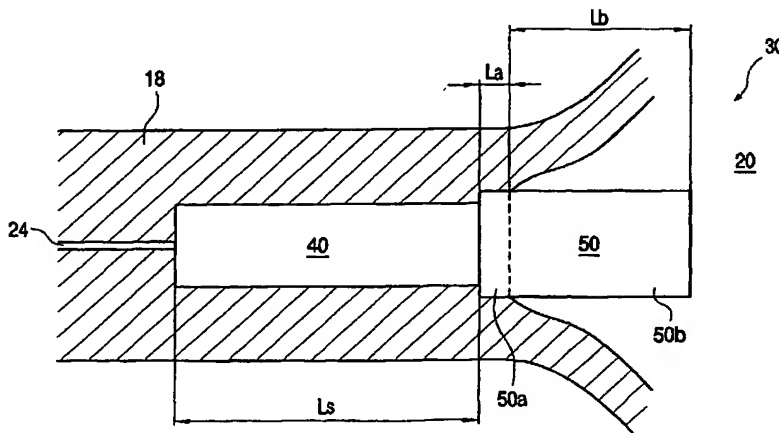
Published:

(75) Inventor/Applicant (*for US only*): **HAACKKE, Michael**

— with international search report

[Continued on next page]

(54) Title: DISCHARGE LAMP



(57) Abstract: A discharge lamp (10) is disclosed with a closed discharge vessel (20) which is surrounded by a wall of transparent material. Two electrodes (30) are present, partly embedded in the wall and projecting into the interior of the discharge vessel (20). At least one, but preferably both electrodes (13) are elongate in shape and comprise a head part (50) and a shaft part (40), which are distinguished by different diameters and/or different materials. Tungsten is preferred for the head part (50) and a tungsten-rhenium alloy for the shaft part (40). The shaft part (40) is enclosed in the wall material, usually quartz, whereas of the head part (50) only a first, short portion (50a) is in contact with the wall, while its second, longer portion (50b) projects into the interior of the discharge vessel (20). Favorable diameters for the head part (50) were found to be 350 to 450 μm , and for the shaft part (40) 150 to 400 μm . A long lamp life is achieved with the electrode design according to the invention, in particular in thermally strongly loaded discharge lamps as preferred for automotive applications. There are additional advantages in a lesser crystallization of the discharge vessel (20), less burning-off of the electrodes (30), and an improved run-up behavior.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
8 April 2004

INTERNATIONAL SEARCH REPORT

In International Application No
PCT/02/05290

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01J61/073 H01J61/34 H01J61/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/00996 A (KONINKL PHILIPS ELECTRONICS NV ; PHILIPS SVENSKA AB (SE)) 6 January 2000 (2000-01-06)	1-6,8-12
Y	abstract page 6, line 15 - page 7, line 2; figure 2 -----	7
Y	WO 98/37571 A (SCHOLL ROBERT PETER ; KUBON MARCUS (DE); PHILIPS PATENTVERWALTUNG ()) 27 August 1998 (1998-08-27) cited in the application abstract; figures 1,2A -----	7
Y	WO 01/035443 A (KONINKL PHILIPS ELECTRONICS NV) 17 May 2001 (2001-05-17) page 4, last line - page 5, line 3 -----	7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

17 November 2003

Date of mailing of the international search report

11.02.2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Lang, T

INTERNATIONAL SEARCH REPORT

II International Application No
PCT/JP02/05290

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0000996	A	06-01-2000	CN 1273691 T DE 69911735 D1 EP 1040509 A1 WO 0000996 A1 JP 2002519833 T US 6534918 B1	15-11-2000 06-11-2003 04-10-2000 06-01-2000 02-07-2002 18-03-2003
WO 9837571	A	27-08-1998	CN 1217815 A CN 1217815 T CN 1217816 A CN 1217816 T DE 69817493 D1 DE 69817716 D1 EP 0909457 A1 EP 0902964 A1 WO 9837570 A1 WO 9837571 A1 JP 2000509892 T JP 2000509893 T US 6060829 A US 6169365 B1	26-05-1999 26-05-1999 26-05-1999 26-05-1999 02-10-2003 09-10-2003 21-04-1999 24-03-1999 27-08-1998 27-08-1998 02-08-2000 02-08-2000 09-05-2000 02-01-2001
WO 0135443	A	17-05-2001	CN 1337059 T WO 0135443 A1 EP 1149404 A1 JP 2003514350 T	20-02-2002 17-05-2001 31-10-2001 15-04-2003

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 02/05290

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1 (first alternative); 2-12 when dependent therefrom

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1 (first alternative); 2-12 when dependent therefrom

A discharge lamp comprising a closed discharge vessel which is surrounded by a wall of transparent material, and two electrodes which are partly embedded in the wall and project into the interior of the discharge vessel, wherein at least one electrode is elongate in shape and has a head part and a shaft part, of which the shaft part is enclosed over its entire length by the material forming the wall, and the head part consists of a first portion which is enclosed by the material forming the wall, and a second, remaining portion which projects into the interior of the discharge vessel, the second portion being longer than the first portion;

wherein the head part and the shaft part are made of different materials.

2. claims: 1 (second alternative); 2-12 when dependent therefrom

A discharge lamp comprising a closed discharge vessel which is surrounded by a wall of transparent material, and two electrodes which are partly embedded in the wall and project into the interior of the discharge vessel, wherein at least one electrode is elongate in shape and has a head part and a shaft part, of which the shaft part is enclosed over its entire length by the material forming the wall, and the head part consists of a first portion which is enclosed by the material forming the wall, and a second, remaining portion which projects into the interior of the discharge vessel, the second portion being longer than the first portion;

wherein the head part and the shaft part have different diameters.
